

Remarks/Arguments:

Applicants thank the Examiner for the Interview conducted on May 11, 2004 and for his helpful suggestions in moving this application towards allowance.

Claims 1-24 stand rejected. Claims 2 and 11 have been cancelled.

Section 103 Rejections:

Claims 1-24 have been rejected as being obvious in view of Melton and Holzapfel. Applicants respectfully submit that this rejection is overcome for the reasons set forth below.

Amended claim 10 now includes features which are not suggested by the cited references, namely:

- a **single radiant source** . . . as a **metrology source**, the radiant source being a **spectral lamp** having a known wavelength profile;
- an optical amplifier configured to amplify the radiation emitted by the **single radiant source** . . . ;
- at least two optical elements configured to produce an interference pattern from the amplified radiation of **the single radiant source**;
- a **filter** configured to pass a predetermined wavelength of the wavelength profile of the amplified radiation, and
- a **spectrometer for receiving only the filtered predetermined wavelength for calibration**.

Basis for amended claim 10 may be seen, for example, in FIGS. 2 and 3. As shown, metrology source 210 provides a single radiant source for emitting radiation. As also shown in FIG. 3, **metrology source 210 includes a spectral lamp of a known wavelength profile**. The **spectral lamp (320), as a single radiant source**, provides an output having a known wavelength profile. This wavelength profile is filtered by **filter 350** to produce a predetermined wavelength. The predetermined wavelength is amplified by optical amplifier 380 and transmitted to a spectrometer for calibration.

The present invention, as claimed, provides a simple approach for calibrating a spectrometer. A metrology source is used that does not add to the complexity of the system, because only one source is used. As discussed in the specification, for example, at page 12, paragraph 44, the spectrometer may be calibrated, because the wavelength of the light from metrology source 210 is known with precision. The precisely known wavelength of light from the metrology source may be utilized to calibrate a wavenumber scale for measurement of power spectrum density data taken during normal operation of the spectrometer.

Melton discloses a method for calibrating the power spectral data obtained with an interferometer based Fourier transform spectrometer, which utilizes a laser based coherent radiant source as the metrology source. At column 2, lines 10 to 25, Melton discloses that spectrometers, for space-based scanning applications, require a reference source with a long operating life. Helium neon-based laser devices, which consume much greater power relative to solid state laser sources, are unsuitable for such long term space-based scanning applications,

because of the limited power availability on the satellites. As a result, preference for a laser source lies with solid state laser diodes. However, a main disadvantage of the solid state laser diode is its thermal detuning and instability.

As a result of these conditions, Melton discloses, in FIG. 3, use of **two sources, laser 32 and neon lamp 33**. At column 7, lines 33-41, Melton discloses that there are reasons for **not using the neon lamp solely as the metrology source**. First, the spectral power output from the neon lamp is low, and insufficient for spectrometer operations. Second, the neon lamp has an operating life expectancy less than that of a laser diode. In order to extend the usable life of the neon lamp, the neon lamp activation time is minimized by only turning on the neon lamp as required.

As a result of these problems, Melton discloses using **both radiant sources** as a metrology source. At columns 5, lines 55 to column 6, lines 22, Melton relies on the correlation between the wavelength of the laser-based interference pattern and the wavelength of the neon lamp-based interference pattern. Melton calculates the wavelength of the metrology laser from a relationship between the number of fringes of the neon lamp and the number of fringes of the laser. After the wavelength of the metrology laser is determined, Melton then can use the output of the laser to calibrate the spectrometer. Accordingly, Melton requires both the neon lamp and the laser to calibrate the spectrometer.

Applicants, on the other hand, **only require a single radiant source** configured to emit radiation as a metrology source, and the radiant source is a **spectral lamp having a known wavelength profile**.

Melton does **not** suggest using a **single radiant source as a metrology source**, where the single radiant source is a spectral lamp having a known wavelength profile. Furthermore, Melton does **not** suggest an optical amplifier configured to amplify the radiation emitted by the single radiant source to produce an amplified wavelength profile. Furthermore, Melton does **not** suggest a **filter configured to pass a predetermined wavelength** of the amplified wavelength profile. Moreover, Melton does **not** suggest a spectrometer for **receiving only the filtered predetermined wavelength for its calibration**.

Holzappel discloses a laser range meter. Holzappel, however, does not suggest the features of claim 10 that are missing from Melton. He does **not** disclose a **single radiant source** configured to emit radiation as a metrology source, where the radiant source is a spectral lamp having a known wavelength profile. Furthermore, Holzappel does **not** disclose an optical amplifier configured to amplify the radiation emitted from the single radiant source to produce amplified radiation of the wavelength profile. Furthermore, Holzappel does **not** disclose a spectrometer for receiving **only** the filtered predetermined wavelength for its calibration.

Favorable reconsideration is requested for amended claim 10. Although not the same, claims 1 and 20 have also been amended to include features similar to amended claim 10, namely:

- generating a **single radiant source** configured to emit radiation as a metrology source having a known wavelength profile of a spectral lamp,
- amplifying the radiation from the single radiant source of the known wavelength profile to produce amplified radiation,

- filtering the amplified radiation to pass a **predetermined wavelength of the known wavelength profile**,
- producing an interference pattern from the **predetermined wavelength**.

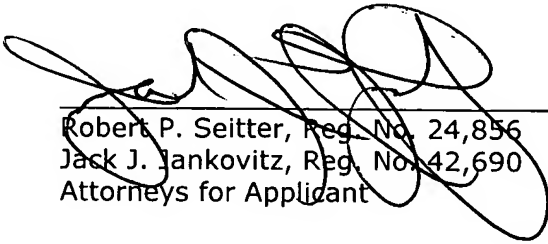
As previously discussed, neither Melton nor Holzapfel suggests the features of a single radiant source emitting radiation as a metrology source, where the radiant source is a spectral lamp having a known wavelength profile, and the spectrometer uses only that filtered predetermined wavelength for its calibration. Favorable reconsideration is requested for amended claims 1 and 20.

Dependent claims 3-9 depend from amended claim 1, dependent claims 12-19 depend from amended claim 10, and dependent claims 21-24 depend from amended claim 20. These dependent claims are, therefore, not subject to rejection in view of the cited references for at least the same reasons set forth for amended claim 10. Favorable reconsideration is requested.

Conclusion

Claims 1, 3-10 and 12-24 are in condition for allowance.

Respectfully submitted,



Robert P. Seitter, Reg. No. 24,856
Jack J. Jankovitz, Reg. No. 42,690
Attorneys for Applicant

JJJ/mc

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[select one of the following]
☒ P.O. Box 980
Valley Forge, PA 19482
(610) 407-0700

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